

## NEXT GENERATION WEATHER RADAR PROGRAM



# ***NEXRAD***

OPERATIONAL SUPPORT FACILITY

**WSR-88D SOFTWARE  
YEAR 2000 COMPLIANCE  
TEST REPORT**

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## **1.0 EXECUTIVE SUMMARY**

The WSR-88D Software Year 2000 Compliance Test was conducted at the OSF from 2-24 May 1998. Nine anomalies were noted while testing the applications software maintained by the OSF. Vendor supplied support utilities accounted for eight anomalies. Only six of the seventeen anomalies have any impact on WSR-88D field sites. The rest have either been resolved or affect OSF software operations only.

The overall effect of these anomalies on the WSR-88D field sites will be minor. The OSF is developing operating procedure changes to eliminate the slight problems which will occur. The new procedures will be in place by early 1999.

One previously discovered problem in the applications software has already been corrected. This fix has been tested and will be released to the field later this year as part of Build 10.

The problems with the vendor supplied support utilities will have a significant impact on the three OSF software support systems. The OSF has purchased an upgrade package for these systems. Two of the systems have already been upgraded. The third will be upgraded by the end of 1998. This will allow future software development and maintenance activities at the OSF to continue without interruption.

The release of Build 10.0 and the changes to operating procedures will correct all of the known operational Y2K problems. Upgrading the OSF software support systems will address the remaining anomalies which have been identified. With the completion of these activities, the entire WSR-88D network will be fully Y2K compliant.

Further testing to ensure compatibility with external systems and consumers of NEXRAD data is expected. The OSF responsibility and goal is to ascertain that the system will be fully available on 01/01/2000, and thereafter, to support the mission requirements for all of our users, user agencies and customers.

## **2.0 INTRODUCTION**

The Operational Support Facility (OSF) is responsible for software maintenance and development for the WSR-88D radar network, one of the major components of the National Weather Service Modernization Program. The WSR-88D system is critical to the protection of life and property by providing the forecaster with a tool that can accurately examine severe weather. Although the risk to the WSR-88D is considered low, it is imperative that this system not be affected by the Year 2000 phenomenon. This report describes the results of the testing conducted by the OSF to ensure that the mission critical WSR-88D software is ready to meet the new century.

Each WSR-88D system consists of three separate computer components, identified by their primary function: Radar Data Acquisition (RDA), Radar Product Generation (RPG), and Principal User Position (PUP). The hardware platform for each of these components is the Concurrent Computer Corporation 3280 Micro-Five. The operating system is Concurrent's proprietary OS/32, version 8-03.1.

Each of the three components runs a distinct set of applications software which is maintained by the OSF. There is also a suite of off-line RDA calibration programs known as the RDA System Operability Test (RDASOT). The currently fielded versions of the WSR-88D applications software are Build 9.0 (RDA and RDASOT) and Build 9.1 (RPG and PUP). Build 10.0 is currently undergoing system testing at the OSF and will be released to the field before the end of 1998.

In 1997 the OSF conducted a preliminary Year 2000 compliance assessment of the WSR-88D software, in accordance with NOAA Year 2000 Compliance Requirements (Appendix A). No significant problems were found in the operational applications software running on the RDA, RPG, and PUP. There was one off-line RDASOT utility which was not compliant. The fix for this utility has been implemented and tested as a part of Build 10.0. In addition, seven Concurrent OS/32 operating system utilities were found to be non-compliant.

The purpose of the May 1998 Y2K compliance test was to confirm the results of the 1997 assessment and to document any additional anomalies which might be discovered. The Concurrent utilities were to be evaluated and the decision made to upgrade to a Year 2000 compliant version or to change operational procedures in order to eliminate or minimize the impact of the non-compliance.

## **2.1 PERSONNEL**

The OSF Year 2000 WSR-88D test team consisted of:

Michael Briggs	Software Engineer
Brian Klein	Meteorologist/Software Engineer
Joe Chrisman	Meteorological Technician

## **2.2 FACILITIES**

The preliminary assessment in 1997 was conducted on the Engineering PUP, Software Development System (SDS), and RDA Software Test System (RSTS) located at the OSF-South facility. Simulated radar data was used during this assessment. The May 1998 full thread test was conducted on the KCRI WSR-88D system located at the OSF-North facility. Using this test system allowed use of actual radar data while eliminating the potential for introducing test data into the operational WSR-88D network. Some data analysis was performed on the SDS and Applications Development System (ADS).

There are three possible configurations for a WSR-88D system: NWS/DOD Single (one RDA and one RPG), NWS Redundant (two RDAs and one RPG), and FAA Redundant (two RDAs and two RPGs). All three configurations were tested.

The test was conducted using Build 10.0 software. This version is still undergoing system testing, but it will be released to the field before the end of 1998. Any changes to the Build 10.0 software subsequent to this full thread test will be carefully checked to ensure there is no impact on Year 2000 compliance.

The evaluation of the OS/32 utilities was performed on the Engineering PUP, SDS, and RSTS.

## **2.3 SCHEDULE**

The full thread test was conducted 2-9 May, 1998. Due to the limited availability of the KCRI WSR-88D, a compressed schedule was used. The OS/32 utilities were evaluated from 11-24 May, 1998.

### 3.0 RESULTS

The model for all test cases was the NOAA Year 2000 Compliance Requirements, as seen in Appendix A. The system clocks on the RDA, RPG, and PUP were synchronized and transitions through such high risk dates such as 9/9/1999 and 1/1/2000 were tested. Recognition of the year 2000 as a leap year was checked as well. The test outline is shown in Appendix B.

The radar was in Operate mode with full data flow, under both local and remote control. All three hardware configurations of the system were tested. All radar data and products were archived and checked for playback compatibility regardless of current system date. Example listings of archived data sets are shown in Appendix C.

Nine applications anomalies and eight utilities anomalies were noted during the test. They are summarized here. Full details are available in Appendix D.

#### 3.1 APPLICATIONS SOFTWARE

Anomaly	Title	Field Impact	OSF Impact	Status
1	RPG system status log date display	Minor	Minor	Closed
2	PUP status log date display	Minor	Minor	Closed
3	RPG selects incorrect adaptation data file	Minor	Minor	Open
4	RDA does not recognize playback command from RPG	None	Minor	Closed
5	PUP must specify product parameters	None	Minor	Closed
6	PUP software status error 578 while reading Arch III disk	n/a	n/a	Closed
7	PUP Arch IV retrieval parameters	None		Closed
8	RDA plays only one VCP after RPG PLAYBACK command	None	Minor	Closed
9	PUP OPTREAD date display	Minor	Minor	Closed

### 3.2 SUPPORT UTILITIES

Anomaly	Title	Field Impact	OSF Impact	Status
10	ERROR reporting utility does not print	Minor	n/a	Open
11	FASTCHEK pauses while initializing	Minor	n/a	Open
12	SINCE option for BACKUP does not work	n/a	Significant	Open
13	ERROR reporting utility does not print	n/a	Moderate	Open
14	FASTCHEK pauses while initializing	n/a	Minor	Open
15	FASTBACK date comparison option does not work	n/a	Moderate	Open
16	Year on memory map produced by LINK is incorrect.	n/a	Minor	Open
17	OBJECT32 date display is incorrect.	n/a	Minor	Open

### 3.3 METRICS AND DOCUMENTATION

The test cases for the full thread test were considered pass/fail. User displays, radar data and products were checked to confirm that all dates are handled correctly. Archived data was checked to ensure that proper data retrieval is possible regardless of system date. Examples of the data set catalogs are available in Appendix C.

All Year 2000 related problems with the OS/32 utilities were documented in order to help develop the new procedures which will avoid the need to upgrade the WSR-88D network.

### 4.0 RECOMMENDATIONS

The minor anomalies which affect the field sites can best be handled by developing and publishing corrective procedures for the field sites. This will minimize the impact of the Y2K problems in the field while eliminating the cost and other risks associated with software upgrades. The new procedures will be in place by early 1999.

The three OSF software support systems must be upgraded to avoid a significant impact on the development and maintenance activities at the OSF. The upgraded software has been purchased and will be installed on all three systems by the end of 1998.

## Appendix A

# NOAA Year 2000 Compliance Requirements

### Meaning of NOAA Year 2000 Compliance

The purpose of this document is to provide a definition for NOAA systems that are Year 2000 Compliant. Throughout the industry, the term year 2000 compliant remains ambiguous and ill-defined. To avoid confusion with less precise descriptions of year 2000 compliance, NOAA will use the term **NOAA Year 2000 Compliant** to identify systems which meet our definition. This document may evolve over time as we learn more about year 2000 requirements and testing.

I. To be **NOAA Year 2000 Compliant**, a NOAA system must be reviewed to confirm that it stores, processes (including sorting and performing mathematical operations), inputs, and outputs data containing date information correctly regardless of whether the data contains dates before, on, or after January 1, 2000.

II. Techniques: dates before, on or after January 1, 2000, may be interpreted and stored using either COMPLIANT or WINDOWING techniques. A system termed **NOAA Year 2000 Compliant** means that the COMPLIANT technique was used. However, compliance by WINDOWING may be used in circumstances where compliance by the COMPLIANT technique is impractical, or where WINDOWING is required to meet specific external interface requirements. If the windowing technique is used, it must be specifically documented in the system description. COMPLIANT and WINDOWING have the following definitions:

COMPLIANT: All dates are stored, processed, input, and output in formats that preserve century, decade, and year information.

WINDOWING: Dates are stored, input, or output in a format that preserves only decade and year information, but are processed through a sliding window calculation. For example, if the year is 00 to 60, add 2000, and if the year is 61 to 99, add 1900. There is no industry standard for the cut-off date used in such calculations, and therefore interfaces may not work correctly between programs or systems using different conventions. Any NOAA system achieving compliance through WINDOWING must clearly document the cut-off date and any other necessary information relating to the bridging calculation used.

### III. Leap Year

The year 2000 itself must be correctly processed as a leap year, i. e., the two days following February 28, 2000, must properly be interpreted as Tuesday, February 29, 2000, and Wednesday, March 1, 2000.



#### IV. Display

When possible, any output or display of a date should use a four-digit year (YYYY). However, if two-digit display of a date is required and does not cause confusion, the year field may be displayed as two digits.

#### V. Firmware and Hardware

Any firmware, hardware, or networking component in a **NOAA Year 2000 Compliant** system must process dates in accordance with the requirements in this document.

#### VI. System Integration

Certification of NOAA Year 2000 compliance extends only to the specific system configuration tested, and does not include other software, firmware, or hardware components which may be used in conjunction with the tested configuration. For an NOAA system configuration consisting of multiple components to be considered **NOAA Year 2000 Compliant**, each constituent component, regardless of source, must be **NOAA Year 2000 Compliant** in accordance with this document, and the system as a whole must be tested for Year 2000 compliance. Constituent components include all software (including operating systems, programs, packages, and utilities), firmware, hardware, networking components, and peripherals provided by NOAA as part of the configuration.

#### VII. Year 2000 System Compliance Requirements

All of the following questions must be answered as indicated or NA for any NOAA system to be identified as **NOAA Year 2000 Compliant**. Any deviations from these responses must be specifically documented.

Although not required, it is highly recommended that “Test Assertions for Date and Time Functions” by Gary Fisher of NIST be used for testing date and time functions. The latest version of this document may be viewed at <http://www.nist.gov/y2k/datetest.htm>.

	<b>DATE MANIPULATION QUESTIONS</b>	NA	No	Yes	Required Value
	<b>Does the system:</b>				
1.	Use December 31, 1999, as a regular end of year without special meaning?			X	NA or Yes
2.	Treat September 9, 1999, as a regular day with no special meaning?			X	NA or Yes
3.	Do any of the following date field manipulations?		X		NA or No
4.	-99 indicates last record		X		NA or No
5.	-00 to indicate a null record		X		NA or No
6.	-99 and 00 default values		X		NA or No
7.	-Special interpretations of 00		X		NA or No
8.	-Hard coded 19 in 4-digit year field		X		NA or No
9.	-Separate manipulations of century digits		X		NA or No
10.	Include any license date expiries associated with the end of 1999?		X		NA or No
11.	Use dates in name constructions?		X		NA or No
12.	Mix date data and control information in commands or flags which are interpreted as one or the other depending on their values?		X		NA or No
13.	Use a date as part of the key of an indexed file?		X		NA or No

	<b>YEAR AND CENTURY QUESTIONS</b>	NA	No	Yes	Yes
	<b>Does the system:</b>				
1.	Recognize 2000 as a leap year?			X	NA or Yes
2.	Allow itself to be set to any date after 12/31/1999 including 02/29/2000?			X	NA or Yes
3.	Indicate the correct day, date and time when the following test is performed: With the date set to 12/31/1999, power the system off and then back on when the time will be in 1/1/2000.			X	NA or Yes
4.	Indicate the correct day, date, and time when the following test is performed: With the date set to some time after 1/1/2000, power the system off and back on.			X	NA or Yes
5.	Display the date correctly as 2/29/2000 when the following test is performed: With the date set to 2/28/2000, power the system off, and then back on when the next day has been reached.			X	NA or Yes
6.	Treat December 31, 1999, as a Friday?	X			NA or Yes

7.	Treat January 1, 2000, as a Saturday?	X			NA or Yes
8.	Treat February 29, 2000, as a Tuesday?	X			NA or Yes
9.	Treat December 7, 2000, as a Thursday?	X			NA or Yes
10.	Treat December 31, 2000, as a Sunday?	X			NA or Yes
11.	Treat January 1, 2001, as a Monday?	X			NA or Yes
12.	Treat March 1, 2000, as a Wednesday?	X			NA or Yes
13.	Treat February 28, 2001, as a Wednesday?	X			NA or Yes
14.	Treat March 1, 2001, as a Thursday?	X			NA or Yes

	<b>DATA BASE ACCESS AND STORAGE</b>	NA	No	Yes	Yes
	<b>Does the system:</b>				
1.	Code all years as in a manner that preserves century, decade, and year information?			X	NA or Yes
2.	Correctly perform all of the following manipulations across the century boundary?			X	NA or Yes
3.	-Computations of time spans, due-dates, etc.			X	NA or Yes
4.	-Sorting of data			X	NA or Yes
5.	-Selections based on key fields			X	NA or Yes
6.	-Selections based on non-key fields	X			NA or Yes

	<b>OS &amp; APPLICATION QUESTIONS</b>	NA	No	Yes	Yes
	<b>Does the system:</b>				
1.	Display the year as an unambiguous value with a minimum of two digits?			X Note 1	NA or Yes
2.	Correctly handle data with dates before 1/1/2000, on 1/1/2000 and after 1/1/2000 with the system clock set to today's date?			X Note 2	NA or Yes
3.	Correctly handle data with dates before 1/1/2000, on 1/1/2000 and after 1/1/2000 with the system clock set to 1/1/2000?			X Note 2	NA or Yes
4.	Correctly handle data with dates before 1/1/2000, on 1/1/2000 and after 1/1/2000 with the system clock set after 1/1/2000?			X	NA or Yes
5.	Correctly handle data with dates before 1/1/2000, on 1/1/2000 and after 1/1/2000 with the system clock set to 12/31/1999?			X Note 2	NA or Yes

6.	Correctly process dates with the system clock set to 12/31/1999 and processing allowed to continue across the century boundary?			X	NA or Yes
7.	Correctly handle date comparisons where one date is not greater than 12/31/1999 and the other date is not less than 1/1/2000?			X	NA or Yes
8.	Use a sliding window for year calculations?			X Note 3	NA or No
9.	Contain a date format that does not preserve century information?		X		NA or No
10.	Create and/or store data in files or log files or, or generate reports that do not preserve century information in date fields?		X		NA or No
11.	Use a 32 bit incrementing signed value for date and time?		X		NA or No
12.	Correctly set and maintain the century digits in the real time clock; if the system uses AT -class PC's (286 through Pentiums and clones), does the operating system or your system software correctly set and maintain the century digits in the real-time-clock?			X	NA or Yes
13.	Correctly handle all time interval calculations based on the century transition - both looking back into the past, and looking forward into the future?			X Note 2	NA or Yes
14.	Correctly handle future time interval calculations that span the century transition?	X			NA or Yes
15.	If required, correctly handle date and time interval calculations based on the use of data previously stored by the system or previous versions of the system?			X	NA or Yes
16.	Formally tested for year 2000 compliance?			X	NA or Yes

Note 1: The RPG and PUP system status logs display the year 2000 as a single 0 (the leading zero is suppressed). Since these logs refer to current system time, a single digit is unambiguous in this context.

Note 2: The WSR-88D deals with real-time or archived radar data only. All current or past data is correctly processed. Retrieval and/or processing of data with future dates is neither required nor valid, regardless of the century.

Note 3: The clock which generates the radar product timestamp uses a sliding window calculation to determine the century. Any two digit century field which is less than 83 is considered to be year 2000 or later, thus the clock will function correctly until the year 2083.

## Appendix B - Test Outline

Subtest	Title
1.1	Clock Settings - RDA
1.1.1	BGL Clock
1.1.2	CDS Clock
1.1.3	System Clock
1.2	Clock Settings - RPG
1.2.1	CDS Clock
1.2.2	System Clock
1.3	Clock Settings - PUP
1.3.1	CDS Clock
1.3.2	System Clock
2.1	Date Transitions - NWS/DOD Single
2.1.1	09/08/99 - 09/09/99
2.1.2	12/31/99 - 01/01/2000
2.1.3	02/28/2000 - 02/29/2000
2.2	Date Transitions - NWS Redundant
2.2.1	09/08/99 - 09/09/99
2.2.2	12/31/99 - 01/01/2000
2.2.3	02/28/2000 - 02/29/2000
2.3	Date Transitions - FAA Redundant
2.3.1	09/08/99 - 09/09/99
2.3.2	12/31/99 - 01/01/2000
2.3.3	02/28/2000 - 02/29/2000

Subtest	Title
3.1	Data Retrieval - NWS/DOD Single
3.1.1	2/29/2000
3.1.2	12/31/99
3.1.3	01/01/2000
3.1.4	Current Date
3.2	Data Retrieval - NWS Redundant
3.2.1	2/29/2000
3.2.2	12/31/99
3.2.3	01/01/2000
3.2.4	Current Date
3.3	Data Retrieval - FAA Redundant
3.3.1	2/29/2000
3.3.2	12/31/99
3.3.3	01/01/2000
3.3.4	Current Date
4.1	Power Fail Recovery - NWS/DOD Single
4.1.1	12/31/99 - 01/01/2000
4.1.2	02/28/2000 - 02/29/2000
4.2	Power Fail Recovery - NWS Redundant
4.2.1	12/31/99 - 01/01/2000
4.2.2	02/28/2000 - 02/29/2000
4.3	Power Fail Recovery - FAA Redundant
4.3.1	12/31/99 - 01/01/2000
4.3.2	02/28/2000 - 02/29/2000

Subtest	Title
5.1	OS/32 Utilities
5.1.1	ACCT
5.1.2	BACKUP
5.1.3	ERROR
5.1.4	FASTCHEK
5.1.5	FASTBACK
5.1.6	LINK
5.1.7	OBJECT32

## Appendix C - Test Data

These Archive II and III data sets were recorded while in FAA Redundant configuration. Similar sets are available for NWS Redundant and NWS/DOD Single modes.

Archive II Data Set: Y2KTAPE1 (FAA REDUNDANT)

Radar ID: KCRI

FILE	HEADER			FIRST RADIAL OF VOLUME SCAN	
FILE	DATE/TIME		VOL	DATE/TIME	VCP
1	<NCDC TAPE LABEL>				
2	09/08/99 23:49:43.6	001		09/08/99 23:49:45.1	21
3	09/08/99 23:55:35.1	002		09/08/99 23:55:35.5	21
4	09/09/99 00:01:27.7	003		09/09/99 00:01:28.1	21
5	09/09/99 00:07:18.5	004		09/09/99 00:07:18.9	21
6	09/09/99 00:13:08.9	005		09/09/99 00:13:09.3	21
7	12/31/99 23:46:10.9	006		12/31/99 23:46:14.8	11
8	12/31/99 23:51:15.3	007		12/31/99 23:51:15.6	11
9	12/31/99 23:56:16.5	008		12/31/99 23:56:16.8	11
10	01/01/00 00:01:17.2	009		01/01/00 00:01:17.5	11
11	01/01/00 00:06:17.2	010		01/01/00 00:06:17.5	11
12	01/01/00 00:11:17.6	011		01/01/00 00:11:17.9	11
13	02/28/00 23:44:40.7	012		02/28/00 23:44:42.2	21
14	02/28/00 23:50:33.0	013		02/28/00 23:50:33.3	11
15	02/28/00 23:55:32.1	014		02/28/00 23:55:32.4	11
16	02/29/00 00:00:31.5	015		02/29/00 00:00:31.7	11
17	02/29/00 00:05:30.8	016		02/29/00 00:05:31.0	11
18	02/29/00 00:10:30.4	017		02/29/00 00:10:30.7	11
19	02/29/00 00:15:29.7	018		02/29/00 00:15:29.9	11



ARCHIVE III Volume name: Y2K3 (A) FAA REDUNDANT

EARLIEST DATE/TIME	LATEST DATE/TIME	FILE NUMBER
09/08/99 23:44	09/09/99 00:13	1
09/09/99 00:07	09/09/99 00:13	2
12/31/99 23:44	01/01/00 00:06	3
01/01/00 00:06	01/01/00 00:26	4
02/28/00 23:44	02/29/00 00:05	5
02/28/00 23:44	02/29/00 00:20	6

Detailed Product List for Product File 3  
(Similar lists are available for the remaining files)

Opening file : P003

Product Name	Data Levels	Res	Elev	Date	Time
Stat				12/31/99	23:44
Stat				12/31/99	23:45
R	16	.54	0.5	12/31/99	23:46
R	16	.54	1.5	12/31/99	23:46
R	16	.54	2.4	12/31/99	23:46
R	16	.54	3.4	12/31/99	23:46
R	16	1.1	0.5	12/31/99	23:46
V	16	.13	0.5	12/31/99	23:46
V	16	.54	0.5	12/31/99	23:46
V	16	.54	1.5	12/31/99	23:46
V	16	.54	2.4	12/31/99	23:46
V	16	.54	3.4	12/31/99	23:46
SW	8	.13	0.5	12/31/99	23:46
SW	8	.54	0.5	12/31/99	23:46
SW	8	.54	1.5	12/31/99	23:46
SW	8	.54	2.4	12/31/99	23:46
SW	8	.54	3.4	12/31/99	23:46
DHR				12/31/99	23:46
DSP				12/31/99	23:46
CR	16	.54		12/31/99	23:46
CR	16	2.2		12/31/99	23:46
SWP				12/31/99	23:46
SRM			0.5	12/31/99	23:46
VIL				12/31/99	23:46
STI				12/31/99	23:46

HI				12/31/99	23:46
M				12/31/99	23:46
TVS				12/31/99	23:46
SS				12/31/99	23:46
LRM				12/31/99	23:46
LTA				12/31/99	23:46
RCM				12/31/99	23:46
OHP				12/31/99	23:46
THP				12/31/99	23:46
STP				12/31/99	23:46
DPA				12/31/99	23:46
SPD				12/31/99	23:46
RCM				12/31/99	23:46
R	16	.54	0.5	12/31/99	23:51
R	16	.54	1.5	12/31/99	23:51
R	16	.54	2.4	12/31/99	23:51
R	16	.54	3.4	12/31/99	23:51
R	16	1.1	0.5	12/31/99	23:51
V	16	.13	0.5	12/31/99	23:51
V	16	.54	0.5	12/31/99	23:51
V	16	.54	1.5	12/31/99	23:51
V	16	.54	2.4	12/31/99	23:51
V	16	.54	3.4	12/31/99	23:51
SW	8	.13	0.5	12/31/99	23:51
SW	8	.54	0.5	12/31/99	23:51
SW	8	.54	1.5	12/31/99	23:51
SW	8	.54	2.4	12/31/99	23:51
SW	8	.54	3.4	12/31/99	23:51
DHR				12/31/99	23:51
DSP				12/31/99	23:51
CR	16	.54		12/31/99	23:51
CR	16	2.2		12/31/99	23:51
SWP				12/31/99	23:51
SRM			0.5	12/31/99	23:51
VIL				12/31/99	23:51
STI				12/31/99	23:51
HI				12/31/99	23:51
M				12/31/99	23:51
TVS				12/31/99	23:51
SS				12/31/99	23:51
LRM				12/31/99	23:51
LTA				12/31/99	23:51
OHP				12/31/99	23:51
THP				12/31/99	23:51
STP				12/31/99	23:51
DPA				12/31/99	23:51

SPD				12/31/99	23:51
RCM				12/31/99	23:51
R	16	.54	0.5	12/31/99	23:56
R	16	.54	1.5	12/31/99	23:56
R	16	.54	2.4	12/31/99	23:56
R	16	.54	3.4	12/31/99	23:56
R	16	1.1	0.5	12/31/99	23:56
V	16	.13	0.5	12/31/99	23:56
V	16	.54	0.5	12/31/99	23:56
V	16	.54	1.5	12/31/99	23:56
V	16	.54	2.4	12/31/99	23:56
V	16	.54	3.4	12/31/99	23:56
SW	8	.13	0.5	12/31/99	23:56
SW	8	.54	0.5	12/31/99	23:56
SW	8	.54	1.5	12/31/99	23:56
SW	8	.54	2.4	12/31/99	23:56
SW	8	.54	3.4	12/31/99	23:56
DHR				12/31/99	23:56
DSP				12/31/99	23:56
CR	16	.54		12/31/99	23:56
CR	16	2.2		12/31/99	23:56
ET				12/31/99	23:56
SWP				12/31/99	23:56
VWP				12/31/99	23:56
SRM			0.5	12/31/99	23:56
VIL				12/31/99	23:56
STI				12/31/99	23:56
HI				12/31/99	23:56
M				12/31/99	23:56
TVS				12/31/99	23:56
SS				12/31/99	23:56
LRM				12/31/99	23:56
LTA				12/31/99	23:56
OHP				12/31/99	23:56
THP				12/31/99	23:56
STP				12/31/99	23:56
DPA				12/31/99	23:56
SPD				12/31/99	23:56
RCM				12/31/99	23:56
R	16	.54	0.5	01/01/00	00:01
R	16	.54	1.5	01/01/00	00:01
R	16	.54	2.4	01/01/00	00:01
R	16	.54	3.4	01/01/00	00:01
R	16	1.1	0.5	01/01/00	00:01
V	16	.13	0.5	01/01/00	00:01
V	16	.54	0.5	01/01/00	00:01

V	16	.54	1.5	01/01/00	00:01
V	16	.54	2.4	01/01/00	00:01
V	16	.54	3.4	01/01/00	00:01
SW	8	.13	0.5	01/01/00	00:01
SW	8	.54	0.5	01/01/00	00:01
SW	8	.54	1.5	01/01/00	00:01
SW	8	.54	2.4	01/01/00	00:01
SW	8	.54	3.4	01/01/00	00:01
DHR				01/01/00	00:01
DSP				01/01/00	00:01
CR	16	.54		01/01/00	00:01
CR	16	2.2		01/01/00	00:01
SWP				01/01/00	00:01
SRM			0.5	01/01/00	00:01
VIL				01/01/00	00:01
STI				01/01/00	00:01
HI				01/01/00	00:01
M				01/01/00	00:01
TVS				01/01/00	00:01
SS				01/01/00	00:01
LRM				01/01/00	00:01
LTA				01/01/00	00:01
OHP				01/01/00	00:01
THP				01/01/00	00:01
STP				01/01/00	00:01
DPA				01/01/00	00:01
SPD				01/01/00	00:01
RCM				01/01/00	00:01
V	16	.54	0.5	01/01/00	00:06
SRM			0.5	01/01/00	00:06

## Appendix D - Anomalies

### Applications Anomalies

Anomaly number: 1

Title: RPG system status log date display

Test step: 2.3.2

Description: The RPG system status log date format is MM/DD/YY. Leading zeros are replaced by spaces. When the system date is set to the year 2000 or later, only a single digit is displayed. The leading zero of the year field is replaced by a single space. Examples: 1/ 1/ 0 ; 2/28/ 1

Analysis: In this context, a single digit representation for the year is unambiguous.

Action: None

Status: Closed

---

Anomaly number: 2

Title: PUP status log date display

Test step: 2.3.2

Description: The PUP system status log date format is MM/DD/YY. When the system date is set to the year 2000 or later, only a single digit is displayed for the year. The leading zero of the year field is suppressed. Examples: 01/01/0 ; 02/28/1

Analysis: In this context, a single digit representation for the year is unambiguous.

Action: None

Status: Closed

---

Anomaly number: 3

Title: RPG selects incorrect adaptation data file

Test step: n/a

Description: The RPG stores the two most recent versions of the adaptation data file. The newest file should be loaded when the RPG software is started. If one file is dated before 01/01/2000 and the other one is dated after, the older file is loaded instead.

Analysis: The date comparison routine does not handle the century transition properly. The older file is incorrectly selected.

Action: Manually update both adaptation data files after 01/01/2000. The file timestamps will be changed and the correct file will be loaded.

Status: Open

---

Anomaly number: 4

Title: RDA does not recognize playback command from RPG

Test step: 3.3.4.7

Description: When an Archive II playback command with a date greater than the current RDA system date is entered from the UCP, the command is rejected by the RDA. "RDA ALARM INVALID COMMAND RECEIVED".

Analysis: The RDA does not recognize playback commands with dates greater than the system date. This problem only arises in a test environment. In practice, there is no requirement for the RDA to process data from the future.

Action: None

Status: Closed

---

Anomaly number: 5

Title: PUP must specify product parameters

Test step: 3.3.4.10a

Description: When the RPG retrieves Archive III products with dates greater than the current system date, the PUP must specify product parameters in order to request the products from the RPG.

Analysis: This problem only arises in a test environment. In practice, there is no requirement for the RPG or PUP to process data from the future.

Action: None

Status: Closed

---

Anomaly number: 6

Title: PUP software status error 578 while reading Arch III disk

Test step: 3.3.4.15

Description:

Analysis: This is a known problem with the product in question and is not Y2K related.

Action: None

Status: Closed

---

Anomaly number: 7

Title: PUP Arch IV retrieval parameters

Test step: 3.3.4.20

Description: When an Archive IV retrieval command with a date greater than the current PUP system date is entered, the command is rejected.

Analysis: The PUP does not recognize retrieval commands with dates greater than the system date. This problem only arises in a test environment. In practice, there is no requirement for the PUP to process data from the future.

Action: None

Status: Closed

---

Anomaly number: 8

Title: RDA plays only one VCP after RPG PLAYBACK command

Test step: 3.3.1.7

Description: When the RPG commands playback of year 1999 Archive II data with the RDA system date set to year 2000 or later, the RDA plays only one VCP, then stops.

Analysis: The RDA playback date comparison routine does not handle the 1999-2000 transition correctly when commanded from the RPG. Playback from the RDA works properly.

Action: Command playback from the RDA instead of the RPG.

Status: Closed

---

Anomaly number: 9

Title: PUP OPTREAD date display

Test step: n/a

Description: The OPTREAD date format is MM/DD/YY. When the date of a product file is the year 2000 or later, only a single digit is displayed. The leading zero of the year field is replaced by a single space. Examples: 01/01/ 0 ; 02/28/ 0

Analysis: In this context, a single digit representation for the year is unambiguous.

Action: None

Status: Closed

---

Anomaly number: 10

Title: ERROR reporting utility does not print



Test step: n/a

Description: ERROR reporting utility will not print system error information recorded after 01/01/2000.

Analysis: The error log will continue to record errors after 01/01/2000, but these errors will not be properly reported by ERROR 8.3.1. However, an error summary can be correctly displayed on the system console. If a field site requires information which is not contained in the summary displayed on the system console, they can ship the error log file to the OSF for further analysis.

Action: Publish procedures to inform field sites of the problem and how to handle it.

Status: Open

---

Anomaly number: 11

Title: FASTCHEK pauses while initializing

Test step: n/a

Description:

Analysis: The FASTCHEK utility is used to initialize and error-check system disks. When the initialize function is invoked, the system date and time is compared to the date and time of the last disk update. The date comparison routine does not recognize 01/01/00 as being later than 12/31/99. The first time this occurs after 01/01/2000, FASTCHEK will pause and the operator will be prompted to check the system date and time. The operator must confirm the date and time and enter "CO" to continue the program. After this one time manual intervention, FASTCHEK will operate correctly.

Action: Publish procedures to inform field sites of the problem and how to handle it.

Status: Open

---

Anomaly number: 12

Title: SINCE option for BACKUP does not work (OSF Only)

Test step: n/a

Description: BACKUP will not accept dates after 12/31/99 when utilizing the SINCE option.

Analysis: The date comparison option of BACKUP 8.3.1 will not function properly after 01/01/2000. This option is not used in the field, but is used extensively at the OSF for generating incremental backups on the SDS, ADS, and SSS.

Action: Upgrade to BACKUP 10.1 on the SDS, ADS, and SSS only.  
Note: OSF software release tapes are prepared on the SSS using BACKUP 8.3.1. Concurrent does not guarantee version 10.1 of BACKUP to be backward compatible with the older version. Even though OSF testing has not revealed any problems in this area, we should continue to use version 8.3.1 to generate tapes for the field.

Status: Open  
The upgrade software has been purchased. SDS and ADS have been upgraded. SSS is scheduled to be upgraded after Build 10.0 is released.

---

Anomaly number: 13

Title: ERROR reporting utility does not print (OSF Only)

Test step: n/a

Description: ERROR reporting utility will not print system error information recorded after 01/01/2000.

Analysis: The error log will continue to record errors after 01/01/2000, but these errors will not be properly reported by ERROR 8.3.1. However, an error summary can be correctly displayed on the system console.

Action: Upgrade to ERROR 10.1 at the OSF only.

Status: Open  
The upgrade software has been purchased. SDS and ADS have been upgraded. SSS is scheduled to be upgraded after Build 10.0 is released.

---

Anomaly number: 14

Title: FASTCHEK pauses while initializing (OSF Only)

Test step: n/a

Description:

**Analysis:** The FASTCHEK utility is used to initialize and error-check system disks. When the initialize function is invoked, the system date and time is compared to the date and time of the last disk update. The date comparison routine does not recognize 01/01/00 as being later than 12/31/99. The first time this occurs after 01/01/2000, FASTCHEK will pause and the operator will be prompted to check the system date and time. The operator must confirm the date and time and enter "CO" to continue the program. After this one time manual intervention, FASTCHEK will operate correctly.

**Action:** Upgrade to FASTCHEK 10.1 at the OSF only.

**Status:** Open  
The upgrade software has been purchased. SDS and ADS have been upgraded. SSS is scheduled to be upgraded after Build 10.0 is released.

---

Anomaly number: 15

**Title:** FASTBACK date comparison option does not work (OSF Only)

**Test step:** n/a

**Description:** FASTBACK will not accept dates after 12/31/99 when using the date comparison option on the RESTORE function

**Analysis:** The date comparison option of FASTBACK 8.3.1 will not work after 12/31/99. FASTBACK 10.1 is not compatible with the version of OS/32 used on the SDS and ADS. A special version of FASTBACK which is Y2K and 8.3.1 compliant is available from Concurrent at additional cost.

**Action:** Purchase compatible version and upgrade SDS, ADS, and SSS.

**Status:** Open  
The upgrade software has been purchased. SDS and ADS have been upgraded. SSS is scheduled to be upgraded after Build 10.0 is released.

---

Anomaly number: 16

**Title:** Year on memory map produced by LINK is incorrect. (OSF Only)

**Test step:** n/a

Description: The task memory map generated by LINK always displays "19" as the first two digits of the year.

Analysis: The problem is only with the printed link map. The executable tasks which LINK creates are unaffected by this problem.

Action: Upgrade to version 10.1 on the SDS, ADS, and SSS only.

Status: Open  
The upgrade software has been purchased. SDS and ADS have been upgraded. SSS is scheduled to be upgraded after Build 10.0 is released.

---

Anomaly number: 17

Title: OBJECT32 date display is incorrect. (OSF Only)

Test step: n/a

Description: Invalid dates are displayed when listing the contents of software libraries using OBJECT32

Analysis: The dates attached to the individual modules become garbled after 01/01/2000.

Action: Upgrade to version 10.1 on the SDS, ADS, and SSS only.

Status: Open  
The upgrade software has been purchased. SDS and ADS have been upgraded. SSS is scheduled to be upgraded after Build 10.0 is released.

---

## **Appendix E - Acronyms**

ADS	Applications Development System
DOD	Department of Defense
FAA	Federal Aviation Administration
NEXRAD	Next Generation Weather Radar (WSR-88D)
NWS	National Weather Service
OSF	Operational Support Facility
PUP	Principal User Position
RDA	Radar Data Acquisition
RDASOT	RDA System Operability Test
RPG	Radar Product Generation
RSTS	RDA Software Test System
SDS	Software Development System
UCP	Unit Control Position
WSR-88D	Weather Surveillance Radar - 1988, Doppler (NEXRAD)
Y2K	Year 2000

## **Appendix F - Retest Addendum**

The WSR-88D Software Year 2000 Compliance Test was conducted at the OSF from 2-24 May 1998. An audit of the test report showed that three NEXRAD products were not tested. The missing products were Hybrid Scan Reflectivity (HSR), Layer Composite Reflectivity with Anomalous Propagation Removed (APR) and the User Selectable Precipitation Accumulation (USP). A retest was performed at the OSF on 15 April, 1999, to test the Year 2000 Compliance of the three products.

The HSR and APR products were the only two products added to the WSR-88D software in build 10.0. At the time of the original Year 2000 Compliance Test the HSR and APR products were not yet added to the RPG product generation list for routine generation. For the USP product, the original tests did not run for a time sufficient for generation of that product. The USP product requires at least an hour of run-time to be generated.

The retest was performed using playback of an archive II tape containing base data captured during the National Weather Service Y2K End-To-End Test from March, 1999. This tape contained data with the needed year 2000 time stamp and a sufficient number of volume scans to allow the generation of the USP products.

The retest showed that all three products were Year 2000 Compliant. There were no anomalies noted during the retest and all displayed dates and times on the products were as expected.

